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## A SUMMARY OF THE RESULTS OF THE 1920 CENSUS OF AGRICULTURE<sup>1</sup>

BY LEON E. TRUESDELL

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### INTRODUCTION

The general policy adopted for the Fourteenth Census was to make available the results of the census as early as possible, with little or no attempt at analysis or even at explanation, except where explanation was absolutely necessary to the understanding of the figures. In other words, the main task assigned to the Census Bureau was to supply the raw material, and to make it available for the use of other agencies in the shortest possible time. In this paper I shall present a few samples of this statistical material, with suggestions as to their possible significance.

### NUMBER OF FARMS AND FARM ACREAGE

The total number of farms reported for 1920 was 6,448,343, which represents an increase of only 1.4 per cent over the number of farms reported in 1910. This slight net increase is the result of considerable gains in some of the western and northwestern states, partly offset by losses in most of the older agricultural states. In the state of Montana, for example, there were more than twice as many farms in 1920 as in 1910. In Wyoming the increase was 43.3 per cent; in Idaho, 36.7 per cent; in California, 33.4 per cent; and in Colorado, 29.8 per cent. These increases were largely offset by decreases in the number of farms in all of the states east of the Mississippi River and north of the Ohio, except Wisconsin.

The total area of land in farms increased from 878,798,325 acres in 1910 to 955,883,715 acres in 1920, a gain of 8.8 per cent. The increase in acreage, like that in number of farms, was the net result of a large increase in the western part of the country, partly offset by decreases in the East.

In several of the eastern states, notably in New England, the decrease in the number of farms and in the farm acreage revealed by the census of 1920 is only a continuation of the decrease which has been going on for two, three, or more decades. To some extent, at least, the decrease in these states represents the giving up of farm land which

<sup>1</sup> Read at the Eighty-third Annual Meeting of the American Statistical Association at Pittsburgh, Pa., December, 1921.

cannot be profitably operated under present conditions, or of what might be termed sub-marginal land. Some of this land would have been given up long ago if its owners had realized its unprofitableness. Much of it is now growing up to timber, and it will prove more profitable for this purpose than it has been for agriculture in recent years.

#### FOREIGN-BORN FARMERS

The total number of foreign-born farm operators in the United States decreased from 669,556 in 1910 to 581,068 in 1920, or 13.2 per cent. The number of farm operators who were born in Germany alone declined from 221,800 in 1910 to 140,667 in 1920, a decrease of 81,133, or 36.6 per cent. Notable decreases were also shown in the number of farm operators born in England, Scotland, Wales, Ireland, and Canada. In all these cases it may be presumed that the principal cause of the decrease was the fact that the men returned to their native countries for war service. On the other hand, there were considerable increases in the number of farmers from the Netherlands, Poland, Hungary, Russia, and Italy.

#### F FARMS BY TENURE

Of the total number of farms in the United States in 1920, 2,454,804, or 38.1 per cent, were operated by tenants, as compared with 37 per cent in 1910, 35.3 per cent in 1900, 28.4 per cent in 1890, and 25.6 per cent in 1880. It thus appears that while the percentage of farms operated by tenants is still increasing, the increase during the last decade was not so great as that which took place in any of the earlier decades for which figures are available.

In all of the states of the New England and Middle Atlantic divisions there was a decrease in the percentage of tenancy, continuing a tendency which has been evident since 1900 or earlier. In some of the states of the far West there were considerable increases in the percentage of tenancy, though even now both percentage and actual number of tenant farms are small. The percentage of tenants among the farmers in North Dakota increased from 14.3 in 1910 to 25.6 in 1920; in South Dakota from 24.8 to 34.9; and even in Iowa the percentage increased from 37.8 to 41.7. In the South as a whole the percentage remained unchanged at 49.6, and among the 16 southern states only 6 showed an increased percentage of tenants.

In the existing economic conditions there are several factors which would normally tend toward a continued increase in tenancy. The supply of free land is exhausted, and the rapid advance in farm-land values during the past 20 years has made it increasingly difficult for a

young man to become a farm owner. Perhaps, then, instead of feeling pessimistic because there were 100,128 more tenant farms in the United States in 1920 than there were in 1910, one should feel optimistic because the increase has not been 200,000 or 300,000.

#### NEW TENURE CLASSES IN THE SOUTH

In the census of 1920 two new tenure groups were added to the classification of farms by tenure in the southern states. Standing renters were separated from cash tenants, and croppers were separated from other share tenants.

Standing renters were defined as tenants who paid for the use of the land a fixed quantity of some product, rather than an amount in cash. The number of standing renters in the South in 1920 was 104,996, and the number of cash tenants, 219,188.

The most important difference between the cropper and the regular share tenant lies in the greater degree of supervision exercised by the landlord in the case of the cropper. As a convenient means of classification, however, croppers were defined as share tenants to whom the landlord furnished the necessary work stock. The number of croppers in the South was 561,091, and the number of regular share tenants, 651,224.

It has been claimed by some writers that croppers ought not to be considered as tenants at all, but rather as hired hands receiving their payment in the form of a share of the crops in place of a stated wage. Although the conditions hardly seem to justify this contention, it is interesting to note what would be the result of a reclassification in which croppers were considered simply as hired hands. The percentage of tenancy in the South in 1920, including the croppers, was 49.6; excluding the croppers both from the number of tenants and from the total number of farmers, the percentage would be 38.9. In the state of Georgia, which in 1920 showed the highest percentage of tenancy among all the states in the United States, the percentage would be reduced from 66.6 to 51.3 if the croppers were excluded. Even with the croppers excluded, however, several other southern states in addition to Georgia would still have higher percentages of tenancy than any of the northern states, among which Nebraska, with 42.9 per cent, and Illinois, with 42.7 per cent, show the highest proportion of tenants.

#### FARM VALUES

The value of all farm property in 1920 was \$77,924,100,338, as compared with \$40,991,449,090 in 1910. This represents an increase of \$36,932,651,248, or 90.1 per cent, during the decade. The absolute

increase, nearly \$37,000,000,000, is certainly big enough to warrant careful consideration, even in these days when values are frequently counted in billions. On a relative basis, however, the increase of 90.1 per cent is less than the increase between 1900 and 1910, which amounted to 100.5 per cent, and considerably less than the increase in the general price level between 1910 and 1920, which was 146 per cent, according to the wholesale price index of the Bureau of Labor.

The increase in farm real estate values, of course, is the principal factor in the increase in the value of all farm property. The value of farm land and buildings in the United States increased 109.5 per cent between 1900 and 1910, and 90.6 per cent between 1910 and 1920. Taking the figures for the average value per acre, in order to eliminate the effect of any increase in farm acreage, it appears that the average value of farm land and buildings per acre of land increased from \$19.81 in 1900 to \$39.60 in 1910, or 100.2 per cent, and again to \$69.38 in 1920, an advance of 75.1 per cent over the value in 1910.

The fact that the average value of farms per acre in the country as a whole increased only 75.1 per cent in the 10 years ending with 1920, as compared with an increase of 100.2 per cent in the 10 years ending with 1910, is especially significant in view of the fact that the general price level increased to a much greater extent between 1910 and 1920 than it did during the preceding decade. Further, the increases shown in the 1920 figures for several of the corn belt states (forming a material part of the increase in the United States as a whole) may be attributed in part to the wave of speculation which swept over that part of the country during 1918 and 1919. The states showing especially high percentage increases in the value of land per acre also include a number of cotton states. And both in the corn belt and in the cotton states the present low prices of farm products have already brought about great reductions in real estate values.

Taking all the circumstances into consideration, then, the figures which by themselves appear to represent such a great increase in farm values in 1920 really indicate a halting in the upward tendency which these values have shown since 1850.

Theoretically, the value of the farm land in any country increases in proportion to the number of inhabitants to be supported per 1,000 acres of cultivated land. As a matter of statistical record, however, the number of inhabitants in the United States per 1,000 acres of improved land shows only a slight net increase since 1850. In 1850, when the average value of farms per acre was \$11.14, there were 205 inhabitants per 1,000 acres of improved land in farms; in 1910, when the average

value of farms per acre was \$39.60, there were 192 inhabitants per 1,000 acres of improved land, or actually fewer than in 1850; and in 1920, with farms valued at \$69.38 per acre, there were only 210 persons per 1,000 acres of improved farm land. The theory, then, has not worked out in the experience of this country up to the present time.

The expectation of a continuous increase in the value of farm land has come to be a fixture in the minds of American farmers, and in many sections it is a fundamental part of the prevailing scheme of farm economics. If the farm income above the amount equivalent to fair wages for the farmer is considered as interest on the farm investment, it seldom amounts to more than 3 per cent. The average annual increase in the value of the farm for the past 20 or 30 years, however, in many parts of the country has been 6 or 7 per cent. The 3 per cent of actual operating income plus the 6 or 7 per cent of increase in value has made up a fairly satisfactory total income on the investment.

It has been evident to many economists studying the problems of farm economics that this increase in the value of farm land could not go on forever. The increases since 1900 have been assisted by a rapid increase in the general price level; in fact, the increase since 1910 has not kept pace with the increase in the general price level. Looking forward, then, as we probably must, to a long period of declining prices, how can we expect the value of farm land to go on increasing?

The farm whose operating income now pays 3 per cent on its purchase (or market) price will have no other source of income by way of supplement. In fact, if the market value of the land declines, the decrease in the selling value of the farm from year to year may even exceed the net operating income. What effect will this have on the rental charged for the use of farms operated by tenants? Such farms constitute a considerable percentage of the total number of farms, both in the South and in the Middle West. The rentals charged now are high enough to make it fairly difficult for the tenant farmer to obtain a satisfactory income. Suppose they were to be suddenly doubled in order to make up for the lack of any further speculative profit from the rise in land values. What would then become of the tenants?

And what are the prospects of the farm owner who has profited greatly during recent years, whether he has realized it or not, from the speculative increase in the value of his land holdings? These are serious questions—questions for the agricultural economist, however, rather than for the statistician. Nevertheless I will venture one suggestion—that the solution of the problem will come chiefly through increased efficiency in the conduct of farming operations.

**MORTGAGED FARMS**

The census figures relating to farm mortgages are limited to those farms which are operated by their owners, no attempt being made to secure mortgage data for farms operated by tenants or managers. The reason for this restriction is that the tenant or manager in very many cases would not know whether the farm was mortgaged or not, and he would be even less likely to know the amount of the mortgage debt.

The total number of farms operated by their owners in the United States in 1920 was 3,925,090. Of these farms 1,461,306, or 37.2 per cent, were reported as mortgaged, as compared with 33.2 per cent in 1910.

The figures representing the amount of the mortgage debt relate only to the farms operated by farmers owning all the land which they operate. This limitation is made necessary by the difficulty of ascertaining the value of that part of the farm covered by the mortgage in cases in which the farmer owned a part of the farm and hired a part of it.

The amount of the farm mortgage debt reported was \$4,003,767,192 in 1920, as against \$1,726,172,851 in 1910. The increase in the amount of debt was \$2,277,594,341, or 131.9 per cent, while the value of the mortgaged farms increased only 117.6 per cent during the same period.

The value of the farms for which the amount of mortgage debt was reported in 1920 was \$13,775,500,013. The debt therefore represented 29.1 per cent of the value, as compared with 27.3 per cent in 1910.

The average rate of interest paid on farm mortgages in 1919 was 6.1 per cent. This item has not been secured in any previous census except that for 1890. The rate then, obtained in a different way but approximately comparable, was 7.07 per cent.

The increase in the number of mortgaged farms or in the amount of mortgage debt does not necessarily indicate any lack of prosperity, since the money is borrowed in many instances for profitable investment in improvements or in the purchase of additional land. A large part of the total doubtless represents the balance due on the purchase price from recent purchasers who paid a part of the price of the farm and gave a mortgage for the rest. Aside from this item, however, the increase in the mortgage debt presents one aspect radically different from the increase in the value of any class of farm property. The value of the farm may double in a decade without making any very material change in the routine of the farm business. That is, the increase may be simply on paper, so to speak. The increase in the mortgage debt, however, aside from the item just referred to, means that the farmers have received and spent for some purpose actual money to the amount

of the increase. Since the amount of the increase in the farm mortgage debt on owned farms alone between 1910 and 1920 was more than \$2,000,000,000 one may well ask what the farmers did with the money.

#### MOTOR VEHICLES, TELEPHONES, WATER, AND LIGHT

Among the new inquiries on the 1920 farm schedule, one that has aroused a great deal of interest relates to the number of farms having motor vehicles, telephones, water, and gas or electric light. According to the returns, 30.7 per cent of all farms in the United States in 1920 had an automobile. Some farms, of course, had more than one, but the significant figure is the number of farms which had at least one. Two per cent of all the farms had a motor truck, and 3.6 per cent a tractor. A telephone was reported by 38.7 per cent of the farms, water piped into the house by 10 per cent, and gas or electric light by 7 per cent.

#### VALUE OF LIVE STOCK

The value of all live stock on farms on January 1, 1920, was \$8,013,324,808, as compared with \$4,925,173,610 on April 15, 1910. The value of the live stock thus shows an increase of 62.7 per cent, which is a smaller relative increase than that shown by any of the other classes of farm property—either land and buildings or implements and machinery. The value of horses, the most important of the domestic animals in point of value in 1910, shows an actual decrease of \$301,510,708, or 14.5 per cent.

The average value of horses per head decreased from \$105.06 in 1910 to \$90.15 in 1920, and the average value of mules increased only from \$124.80 to \$143.45. In contrast with the decrease in the average value of horses and the slight increase in the value of mules, the several kinds of meat animals (cattle, sheep, and hogs) show average values for 1920 more than double those of 1910.

#### HORSES AND MULES

The number of horses on farms reported for January 1, 1920, was 19,767,161. The number of horses reported for April 15, 1910, was 19,833,113 including 612,775 spring colts. If we compare the numbers as reported, the 1920 figures show a decrease of 65,952, or 0.3 per cent. If we deduct the spring colts from the 1910 figures, on the ground that they could not have been counted on the first of January, since they were not then in existence, the figures show an increase of 546,823, or 2.8 per cent. The actual increase was somewhat less than this, however; for the number of mature horses (or horses and yearling colts)

would be smaller in April than in January, since some would have died during the intervening months. These would offset, in part, the number of spring colts born between January and April.

The number of mules on farms on January 1, 1920, was 5,432,391, as compared with 4,209,769 on April 15, 1910. Making the comparisons in the same way as for the horses, the minimum increase in the number of mules was 1,222,622, or 29 per cent, and the maximum increase was 32.5 per cent. Between these two figures—perhaps about half-way between—lies the actual increase.

#### CATTLE

The number of cattle on farms in the United States on January 1, 1920, was 66,652,559, while the number on April 15, 1910, was 61,803,866, including 7,806,539 spring calves, which would not have been reported, of course, if the 1910 census had been taken in January. On the other hand, a census taken in January would have included the large number of cattle which were marketed or slaughtered during the first three and one-half months of the year. The two factors affecting the comparability of the figures for 1910 and 1920 are about the same, then, as with the horses and mules, except that the margin between them is much greater. The total number of cattle reported for 1920 exceeds the total number for 1910 by 4,848,693, or 7.8 per cent. The total number of cattle reported for 1920 exceeds the number in 1910, omitting the spring calves, by 12,655,232, or 23.4 per cent. The minimum percentage of increase is 7.8, and the maximum is 23.4. The actual increase is less than the maximum by the number of cattle slaughtered or marketed by farmers between January 1 and April 15, 1910.

The change in the date of enumeration probably affected the number of dairy cows much less than it did the number of all cattle, but there was also a change in the age classification. Dairy cows in 1910 included all cows and heifers over 1 year of age on January 1 of the census year, while dairy cows in 1920 included only those cows 2 years old and over on January 1 of the census year. The number of dairy cows 2 years old and over reported for 1920 was 19,675,297, and the number of dairy heifers 1 year old and under 2 years was 4,048,851. There were thus 23,724,148 dairy cows and heifers 1 year old and over, as compared with 20,625,432 in 1910. This gives an increase of 3,098,716, or 15 per cent. In considering the absolute increase, however, it should be remembered that this includes yearling heifers. The increase in dairy cows 2 years old and over would be about 2,550,000.

#### PURE-BRED LIVE STOCK

Pure-bred live stock of some kind (either horses, cattle, sheep, or swine) was reported in 1920 by 693,724 farms, or 10.8 per cent of the total number in the United States in 1920. Of the total number of horses on farms, 0.6 per cent were reported as pure bred; of the cattle, 3 per cent; of the sheep, 1.3 per cent; and of the swine, 3.5 per cent.

#### DAIRY PRODUCTS

The value of dairy products of farms in 1919, including butter and cheese made and milk, cream, and butter fat sold, was \$1,481,462,091, as compared with \$596,413,463 in 1909, thus showing an increase of 148.4 per cent. A large part of this increase, of course, was the result of higher prices; but after making allowance for an increase of 115 per cent in the prices of dairy products, there still remains an increase of 15.5 per cent in the production.

The quantity of milk produced in 1919, including estimates for farms which reported dairy cows on hand but failed to report their milk production, was 7,805,143,792 gallons, which represents an increase of about 18 per cent over the production of 1909.

The production of butter on farms in 1919 was 707,666,492 pounds, as compared with 994,650,610 pounds in 1909. The decrease (amounting to 28.9 per cent) in the farm production of butter was more than made up, however, by an increase in the factory production. Incidentally, the 1919 figures indicate that the movement of butter production to the factories and away from the farms is still making rapid progress. In 1899 only 28.2 per cent of the total production of butter was made in factories; in 1909, 38.6 per cent; and in 1919, 56.5 per cent, or considerably more than one half. And if only that butter which is produced for sale is considered—taking the amount of butter *sold* by farmers, in place of the total quantity *made* on farms—it appears that 81.6 per cent of the commercial production of butter in 1919 was made in factories and only 18.4 per cent on farms.

#### CROPS IN GENERAL

The total value of farm crops harvested in 1919 (not including forest products) was \$14,755,364,894, as compared with \$5,231,850,683 in 1909. These figures represent an increase of \$9,523,514,211, or 182 per cent, for the decade. In other words, the value of all farm crops in 1919 was nearly three times the value in 1909. This enormous increase in the value of crops is due mainly, however, to the fact that the prices of crops were unusually high in the year 1919. A tabulation of the quantities of all the important crops harvested in 1919 with values computed

on the basis of the 1909 prices indicates an increase of only 9 per cent. So much of the increase in value, therefore, may be attributed to increased production, and the remainder to higher prices.

The index of the census prices of all farm crops in 1919, taking the values of 1909 as 100, is 257, and the index for crops and live-stock products together is 248. The latter index is only a little higher than the Bureau of Labor's index of wholesale prices of farm products which, as computed for the same years, was 241.

The total acreage of all crops harvested in 1919 for which acreage was reported was 348,551,669, as compared with 311,194,516 acres in 1909, representing an increase of 12 per cent.

#### PRINCIPAL CROPS

The acreage of corn harvested in 1919 (not including silage or corn cut green for fodder) was 87,771,600, as compared with 98,382,665 in 1909. The acreage of wheat on the other hand increased from 44,262,592 in 1909 to 73,099,421 in 1919. There was thus a decrease of 10,611,065 in the acreage of corn and an increase of 28,836,829 in the acreage of wheat. To a considerable extent, without doubt, the increase in the wheat acreage was the result of a temporary condition, namely, the guaranteed price for wheat for the crop of 1919; and under present conditions several million acres of this land are doubtless again used for raising corn.

The production of corn in 1919 was 2,345,832,507 bushels; of wheat, 945,403,215 bushels; and of oats, 1,055,182,798 bushels. These three crops constitute the bulk of our cereal production.

The production of hay and forage in 1919, not including 17,793,742 tons of corn cut for forage, was 128,549,499 tons, as compared with 97,755,296 tons in 1909, an increase of 12.8 per cent. The production of silage crops in 1919 was reported by 378,887 farms, or 5.9 per cent of all farms in the United States. The acreage in silage crops was 4,003,226 and the production 29,682,041 tons, which was more than three times the production in 1909.

The production of tobacco increased from 1,055,764,806 pounds in 1909 to 1,372,993,261 pounds in 1919, or 30 per cent, and the production of cotton increased from 10,649,268 bales to 11,376,130 bales, or 6.8 per cent.

#### SUMMARY

By way of summary three or four outstanding features in the results of the farm census of 1920 may be mentioned. There have been considerable increases in the number of farms and in farm acreage in the West and the Northwest, partly offset by decreases in the eastern states.

The increase in farm values between 1910 and 1920, although very great in absolute amount, represented a smaller percentage for the decade than did the increase between 1900 and 1910. This fact, taken in connection with the enormous increase in the general price level during the past decade and other existing conditions, is believed to indicate that the value of farm property reached a peak in 1920 and that further increases should not be expected in the immediate future. The farm mortgage debt, as measured by the debt on farms operated by their owners, considerably more than doubled between 1910 and 1920. Crops and live-stock products showed some increase in quantity during the ten years ending with 1919, but the large increases in value were due mainly to increased prices.

#### DISCUSSION<sup>1</sup>

By C. L. STEWART

There is danger that the country may be lulled to indifference by reports that the rate of increase of farm tenancy in the United States is rapidly diminishing. It is true that the number of tenant farms per thousand grew from 353 in 1900 to 370 in 1910, an increase of 5 per cent, whereas from 1910 to 1920 the number grew from 370 to 381, an increase of only 3 per cent. When measured on the basis of acreage and value, however, the number of rented acres per thousand and the number of dollars worth of rented land per thousand was not only higher than that shown on the preceding basis, but has been growing at much faster rates during both of the decades since 1900, especially during the decade just ended. While the proportion of rented farms increased but 3 per cent between 1910 and 1920, the proportion of leased property values and of leased acreage increased 11 per cent.

In other words, the tenure of American farm real estate cannot be correctly stated in terms of farms only. In most sections farms operated by tenants differ in size and value from farms of other operators. Furthermore, parts of farms are hired by so-called "part-owners." These can properly be accounted for as operators of tenant realty only in statistics of acreage and value.

In 1920 part-owner tenancy involved 89 million acres and nearly 4 billion dollars worth of land and buildings. At the same date "full" tenancy claimed 265 million acres and nearly 24 billion dollars worth of land and buildings. Altogether 354 million acres and nearly 28 billion dollars worth of land and buildings were operated by lessees.

To reduce the lessee acreage and values to percentages of all farm

<sup>1</sup>Also read at the Pittsburgh meeting.